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Journal of the Society of Arts.

FRIDAY, JANUARY 17, 1868.

Announcements by the Council.

ARTISANS' REPORTS ON THE PARIS EXHIBITION.

The Reports of the Artisans selected by the Council to visit the Paris Exhibition are now ready, and may be had of the Society's publishers, Messrs. Bell and Daldy, York-street, Covent-garden. One volume; demy 8vo., 732 pages, price 2s. 6d. The volume contains reports, by upwards of eighty artisans, upon the principal industries represented in the Exhibition, as well as special reports on the condition and habits of the French working classes.

ORDINARY MEETINGS.

Wednesday evenings, at Eight o'clock:—

JANUARY 22.—"On the Reports of the Artisans selected to visit the Paris Universal Exhibition of 1867." By WILLIAM HAWES, Esq., Chairman of the Council.

JANUARY 29.—"On the Climate and Industrial Prospects of the Colony of Natal." By Dr. MANN, Superintendent of Education, and Special Commissioner for the Colony.

FEBRUARY 5.—"On Trade Museums." By J. FORBES WATSON, Esq., M.D., Reporter on the Products of India.

FEBRUARY 12.—"On the Supply of Animal Food to Britain, and the Means Proposed for Increasing it." By WENTWORTH LASCELLES SCOTT, Esq., F.C.S.

CANTOR LECTURES.

The second course for the present session will be "On Food," and will be delivered by Dr. Letheby, M.A., Professor of Chemistry in the College of the London Hospital, and Medical Officer of Health, and Food Analyst for the City of London, as follows:—

MONDAY, JANUARY 20TH.—LECTURE I.

Varieties of Food—their Chemical Composition, and Nutritive Value.

MONDAY, JANUARY 27TH.—LECTURE II.

Comparative Digestibility of Foods. Functions of different Foods. Construction of Dietaries.

MONDAY, FEBRUARY 3RD.—LECTURE III.

Preservation, Preparation, and Culinary Treatment of Foods.

MONDAY, FEBRUARY 10.—LECTURE IV.

Adulterations of Food. Conclusion.

The lectures will commence each evening at 8 o'clock, and are open to members, each of whom has the privilege of introducing two friends to each lecture. Tickets were forwarded with the last number of the *Journal*.

CONFERENCE ON TECHNICAL EDUCATION.

This Conference will be held in the Society's Great Room, on Thursday and Friday next, January 23rd and 24th. The chair will be taken each day at twelve o'clock, by Wm. Hawes, Esq., F.G.S., Chairman of the Council. The Council propose the following programme of the topics for discussion at the meeting. As they have reason to expect that the Conference will be numerously attended, and it is only to sit for two days, it is thought desirable that it should deal rather with general principles than with details, and that the latter should be taken up more deliberately by the committee which it is proposed should be established:—

1.—The necessity for improved national education for the working classes generally.

(a.)—Improved primary education, and the measures necessary for securing the same.

(b.)—Additional facilities in primary schools for affording the elder children the means of learning the elements of scientific knowledge.

2.—The necessity for the establishment of schools for technical and industrial education in relation to science and art, in which pupils, after leaving the primary schools, may obtain instruction suited to the special industries with which they may be connected, as workmen, foremen, or managers.

3.—The best measures for securing the foregoing object.

4.—How far technical education can be promoted by the aid of existing educational endowments.

5.—To request the Council to appoint a standing committee of members of the Society of Arts and others, to take whatever steps may be required to advance the objects approved by the conference, and to send deputations to the Government, to support such applications as may seem desirable.

SUBSCRIPTIONS.

The Christmas subscriptions are due, and should be forwarded by cheque or Post-office order, crossed "Coutts and Co.," and made payable to Mr. Samuel Thomas Davenport Financial Officer.

Proceedings of the Society.

SIXTH ORDINARY MEETING.

Wednesday, January 15th, 1868; SEYMOUR TEULON, Esq., Treasurer of the Society, in the chair.

The following candidates were proposed for election as members of the Society:—

Bell, Arthur George, 4, York-st., Covent-garden, W.C.

Boyle, Edwin, 10, John-street, Adelphi, W.C.

Dalziel, Alexander, Cardiff.

Davies, Valentine, Furnace-house, Carmarthen.

De Lavigerie, Alfred D., 11, Sussex-street, Warwick-square, S.W.

Hollond, Edward, M.P., Dumbleton, Evesham, and Union Club, S.W.

Hooper, Frank, 24, Russell-street, Covent-garden, W.C.

Klein, Julius, Ph.D., 176, New North-road, and 3, Wilton-square, N.

Limbert, Edward Harvey, 5, Hercules-terrace, Upper Holloway, N.

Marr, James, 19, Bessborough-gardens, S.
 Mort, William, 155, Fenchurch-street, E.C.
 Pilling, Jonas, Manchester and Liverpool District Bank, Salford.
 Reveley, H. J., Bryn-y-gwin, Dolgelly, North Wales.
 Richardson, J., 13, Savile-street, Hull.
 Round, Edwin, Tudor Works, Sheffield.
 Rudkin, Thomas, 17, Newgate-street, E.C.
 Smith, John, 22, Russell-street, Covent-garden, W.C.
 Tappen, G. C. W., Horley-villa, Horley, Surrey.
 Venables, Benjamin, 253, Camden-road, N.W.
 White, J. Ludford, 111, St. George's-road, S.W.

The following candidates were balloted for, and duly elected members of the Society :—

Cox, Frederick, 100, Newgate-street, E.C.
 Crowe-Read, Commander Offley Malcolm, R.N., Llandinam, Montgomeryshire.
 David, Charles W., Cardiff.
 Garrett, Richard, Carleton-hall, Saxmundham.
 Haysmar, David, Portway-house, Weston, Bath.
 Headlam, Alfred, Wavertree, Tunbridge Wells, Kent.
 Humble, Michael, Gwersyllt, Wrexham.
 Jay, Captain William Chickhall, 33, Cavendish-sq., W.
 Levett, Robert, Packington-hall, Lichfield.
 Llewellyn, Thomas, M. Newport, Monmouthshire.
 Lloyd, John, Huntington-court, Hereford.
 Payne, W., 6, Salisbury-court, E.C.
 Prideaux, Charles Grevile, Q.C., Brick-ct., Temple, E.C.
 Scarborough, Thomas H., 5, Bloomsbury-square, W.C.
 Smith, David, Siddal, Halifax, Yorkshire.
 Wilson, Charles Thomas, Brynnewydd, Swansea.

The Paper read was—

DETAILS OF A PROJECT FOR THE PREPARATION AND DISTRIBUTION OF HOT FOOD, BY DELIVERY SERVICE AT THE HOMES OF THE PEOPLE, IN CITIES AND TOWNS.

By WM. RIDDLE, ESQ., CIVIL ENGINEER.

Your Food Committee were good enough to invite me to make a statement to them, in consequence of certain correspondence with an esteemed member of your Council, Mr. Harry Chester, to whom I am under obligation for bringing the subject of this paper before your society, and who, I regret to say, informs me he is too unwell to be here to-night.

My statement appeared in your *Journal* of the 15th of November last year. It contains the outline only of my project. I now propose to treat this matter more in detail, and to develop my plan completely.

1. The best way I can think of to put the plan outlined in the statement I have mentioned to a practical trial is, I will at once say—for I can only look at the matter in a practical shape—to raise, somehow, a capital of £7,000; to hire a plot of ground, by preference (so far as I am concerned) at Holloway, and put on it a building of iron and glass, 160 feet long by 40 feet deep, in 16 squares of 20 by 20 feet each, and about 18 feet high, with louver ventilators. Our building should be of interchangeable parts, a plain, cheap, rectangular probably ridge-and-furrow-roofed structure, like a section of our old Crystal Palace of 1851, 160 feet by 40. Here is a plan of it.

I	K	L	M	N	O	P	Q
A	B	C	D	E	F	G	H

Each letter indicates a square, 20 feet by 20 feet. This building will cost £1,500 to £1,800, I am told by one who has built such structures, and I think he is about right. This building is to be fenced off inside just as we may require it. We shall want a six or eight h.p. engine and boiler. This may be bricked up. We shall want drainage for our waste water, &c. I put £200 extra on this head. Our building is to be raised from the ground at least a foot, and ventilated beneath for dryness. It will be on concrete, brick, and sleepers, or creosoted beams, in such a way that no part will be a permanent structure. Like a four-post bedstead, it may be taken down and sold for horticultural or other purposes. Please mark that I would have a permanent structure, if necessary, of brick and mortar, but I greatly object to such, and think the iron and glass infinitely better. We want light, portability, adaptability, dryness, freedom from dust, from rats and mice, from decay; advantages so important and obvious, that glass and iron should be used far more than they are.

2. The district I propose first to work is Islington and its neighbourhood. It is respectable, and neither too high nor too low in condition.

3. Of the diagram plan before you, A B C indicate—A, the butcher's shop where killed meat is received; B, the vegetable shop, or store, where vegetables are received; and C, the dry store, where flour, raisins, sugar, &c., &c., are received and stored. From these three stores will proceed our raw materials in bulk.

4. In compartment D (see plan) puddings will be mixed in steam engine-driven pug-mills, many cwt. daily, done in convenient batches and put into closed tins for sale, in which same tins they will be steamed or cooked in iron rooms or chambers (being done some hundreds at a time) in our cooking apparatus. This steaming will be done in the next part of our building, E F G, where our cooking apparatus, representing probably in its general bulk cubical dimensions equal to about five cubes of 10 feet each, will be placed.

5. In our butcher's shop, or store, aforementioned, there will be racks for (say) 100 enamelled iron dishes, capable of holding 100 joints of meat of about 18 lbs. each, more or less, but each dish holding about an equal quantity. The racks will be of wood or plain galvanized iron rods. The butcher will daily arrange joints on these dishes, and will remove superfluous bone, and, wherever it can be conveniently done, will cut out the bones of the joints, for on this will depend a good deal of the expedition in carving. In the butchers' department will be pickling vats, for pickling beef and pork with salt, saltpetre, and, if desirable (as I sometimes think), with the addition of sugar.

6. In the vegetable store, cabbages will be cut and washed, and water will be laid on to vats or troughs on purpose. This work may be done by women. Potatoes will come to us ready washed probably, by the merchant, in the ordinary course.

7. Carts will periodically bring killed meat, and daily bring vegetables, to us from our meat and vegetable agents or contractors, so we shall have everything "fresh and fresh." These contractors will operate only according to requisitions made by certified printed forms filled in daily in the manager's department of our building. These forms, like banker's cheques (in principle),

will be sent to Covent-garden or other sources of supply. We may (and probably shall, under guarantee of quality) make contracts for meat and vegetables to be sent by railway from the country, far off, in answer to numbers of quantity telegraphed, or to letters sent daily or otherwise.

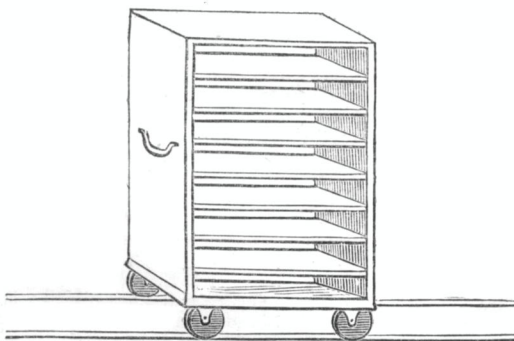
8. Our dry-store department will receive flour from flour mills by contract; groceries from the cheapest wholesale markets, from shippers or first-class merchants, without loss by commission; raisins, currants, rice, sugar, direct from Travers and Son, or other responsible traders.

9. I propose, at the outset of this project, to begin with a very simple bill of fare, because on that at first will greatly depend simplicity of operations, or, in other words, the profitableness of our undertaking. This is important to bear in mind. We want to give a plain good hot dinner to those who now often get but a cold and indifferent one; a plain, sensible, indisputable, English dinner. This is all I would attempt at first. Now, what may that usually consist of? We might commence with one sort of meat, one sort of pudding, two sorts of vegetable (green vegetable and potatoes) daily, say roast beef, or roast mutton, or boiled beef, or boiled mutton, or boiled pork; plum pudding, or rice pudding, or currant pudding, or lemon pudding, or roll jam or molasses pudding; potatoes mashed, and greens, or cabbages, or turnips mashed, or carrots mashed, or peas pudding, *i.e.*, one joint, one pudding, and two vegetables daily. Potatoes mashed for special reasons. (If plain boiled they will not improve in the canisters, and will require a much larger size of canister than we can well spare.)

10. I think the foregoing would do at first, changing over the above scale day by day.

(I may here make the remark, by way of parenthesis, that there is room for a pork-pie equal to what the so-called "Melton Mowbray" sometimes, but not always, is, at a fairly low price. I say a low price, because it can be done at a low price, and yet of quality quite first class. If we could get land conveniently near our building, we might utilize our waste cabbage cuttings and potato parings, probably, to keep pigs. We may come to require an outlet for a certain amount of returned stores, or surplusage, &c., for with the best organisation, on an issue of perhaps some tons of cooked food daily, there will be a margin of what would otherwise constitute waste, suitable, perhaps, for pigs and not for horses.)

11. I purpose to have a tramway flush with the floor, 1ft. 10in. wide or so, running from end to end of our building, with turntables of the simplest kind. On these trams we should send our hundred dishes of meat to be baked, on suitable trucks. (See woodcut.)



We also send, on such trams, our greens or cabbages, in large oblong rectangular baskets lined with tin, like those, as to the basket-work, seen on railway platforms. Our potatoes in nets are thus sent out of store. All things are first weighed to the printed filled-up forms

sent in to the stores the previous night from the counting-house. On tramways the food of various kinds, and the puddings in tin from the pudding-kitchen, are sent to the cook-house. Our general transfer processes are conducted throughout our establishment in such a way, that one department will not be encroached on by another.

12. The trams are not to run through the several stores, but alongside them, outside a barrier. The tramway system is an excellent one. Wherever it can be used it keeps things in order, prevents litter, prevents encroachments beyond boundaries, prevents bruising and concussions, prevents noise, diminishes labour, and renders a factory or establishment what it ought to be, *i.e.*, all parts of a machine approximating (if I may so speak) to the automatic.

13. One department will be fenced off from another with iron and glass, excepting sliding or other doors, or delivery windows for vouchers, &c.

14. I have referred to compartments A and B and C, also to D where puddings are made. In this compartment or department D, we have mixing-machines, as the pug-mills I have referred to, or Stevens's bread-making machine, so modified as to be suitable for our mixing for puddings, or some other sort of machine for the purpose. There are several good ones.

15. We have water laid on to these mixing-machine troughs or mills, and also means of letting water off from them for cleaning them.

16. In this pudding-making department we have a cam-worked or other engine-worked suet-chopper acting on a wood block, the suet blades working through clearing-plates, like the blades of a cupping instrument. We have, in short, any other apparatus of the sort brought to bear admirably on a small scale, of late years, in first-class kitchens and establishments, for preparing materials. We shall take those principles already verified and used for materials in little, and use them for materials in bulk.

17. Our hot food will be sent out in three sizes of plain canister or tin, and only in this way. Our pudding department will contain racks for tins, and carriages like the truck or tram-carriage I showed in the drawing. On wall-racks and on the tram-carriages our tins, cases, or canisters will be ranged. These tins or metal cases will be not unlike the ordinary tin canister now much used for the sale of coffee by retail; they will be in 1 lb., 2 lb., and 4 lb. sizes, and no others. They will be all alike, for all our foods, in shape and make, and will be unusually strong and plain cylinders, with lids, and will be hard soldered. These sizes of 1, 2, and 4 combine well; for instance—

1 lb. and 2 lb. of meat	make	3 lb.
1 lb. and 4 lb. "	"	5 lb.
2 lb. and 4 lb. "	"	6 lb.
1 lb., 2 lb., and 4 lb. "	"	7 lb.
4 lb. and 4 lb. "	"	8 lb.

This renders the ordering by consumers a simple matter. Since writing the foregoing, an Oxford University man has told me that this plan of tin cases is like the way the University men received their food from hotels when he was an Oxford man, many years ago and it answered capitally.

18. The puddings, as made, will be filled into the tins, and the lids put on. The tins will be placed on the shelves of the tram-carriage, which last, by a small turntable, forming part of the tramway outside the barrier, may be moved into the pudding department when wanted, and loaded with the closed tins of pudding, say 100 or so at once, as fast as they are made. When one carriage is thus loaded, it is passed through the barrier on to the turn-table; the turn-table turns of itself by pulling the carriage round by its end handles, and then the carriage is passed down to the cook-house to the pudding-steaming chambers.

19. D B R, squares in the plan (preceding page),

represent a space of 60 feet by 20, or 3 squares of 20 feet. In this are our roaster, boiler, and steamer—a block of brick flues, and iron plates, with oven, and boiling, and steaming chambers. It is about 50 feet long, and 12 or 14 wide, and of proportionate height, and fitted up, say by Benham and Sons, who have had ample experience for the certain production of excellent results with the small amount of fuel, of 1 lb. per diem for 5 adults, for all their meals and hot water. I have (as I said in my statement in your *Journal* of the 15th November) seen the excellent roasting performed by Benham's apparatus for more than a thousand of the Guards at one time. The results seemed to leave nothing to be desired. The roasting seemed to me first-rate, and by no means the coddled production of the common journeyman baker's oven, or of the common range oven. But there are other sorts of apparatus than Benham's, so well known to you that I need not name them. We shall combine the principles of each of the best for our large apparatus. In New York, I am told, the coal used is anthracite, or smokeless coal, and that it presents peculiar advantages for cooking is obvious. We cannot use the very excellent American cooking apparatus in England, for the want of smokeless coal, or rather for the usage which interferes with its adoption. At Holloway, by the use of anthracite, we may be quite sure of not plaguing the neighbourhood with smoke. The North London Railway, for three or four months, have been using anthracite with great satisfaction. The gain in heat is said to be 25 per cent. Anthracite is used at the City Flour Mills.

20. I have thus tried to explain to you our building arrangements, until you can imagine the joints arriving at the cook-house on the shelf-built tramway-truck, or trucks, or carriages; also the puddings; also the potatoes, in nets; and other vegetables in tin-lined basket-carriages.

21. The puddings may be steamed, if desirable, by relays. Plum puddings would not spoil thus. Some sorts would not bear it so well. Plum puddings require some six or eight hours, and in all the 24 hours there would probably be a batch or two under steam, in the same closed tins the consumer will receive them in; the out-sides clean and bright-scoured from time to time by revolving leathers and rotten-stone, applied in a novel manner. The tins are separated by gratings in the steaming chamber.

22. The potatoes are steamed in their nets. The cabbages or greens are put into cisterns of boiling water, which cisterns have false, loose, perforated bottoms. When cooked the water is drawn off by a tap; a board with some hundredweights, or lever pressure, by a board or plate, is then brought to bear on them, and so the water is pressed out, and then, by tackle from the roof, the false bottom is raised out of the cistern or cisterns, and the greens or cabbages in bulk, previously pressed flat, and drained, as I said, are cut into small squares by sharp sword-blades; and thus in small block-like portions they are transferred to the canisters alongside, and sent away to the cart-loading room by the tramways. I have improved on the foregoing arrangement.

23. The potatoes I recommend to be mashed, because *au naturel* they may spoil, and will be too bulky for my tins (*"le jeu ne vaut pas la chandelle."*). Potatoes well mashed are generally preferred, and will keep in excellent condition, I think, much longer, and occupy less space; they will fit our tins only in this way. If we sacrifice one advantage we gain another. For mashing potatoes, 18 or 20 young girls, neat and clean, sit at three tables; each table is 10 or 12 feet long. On the under side of each table is a square wooden trench, about 8 inches deep and 14 inches wide. The nets of potatoes are placed in front on the other side of the narrow tables to that at which the girls sit, and matters are so arranged that they can peel the potatoes, and let them fall when peeled into a projecting part of the trench in front, and the peel, or skin, as it accumulates,

is pushed into another parallel smaller trench behind the table, underneath the nets. As the trenches fill, a hoe is used to draw the peeled potatoes the entire length of the 10 or 12-foot trenches of the three tables, into tin-lined baskets. The peel or skins are also drawn out of their separate trenches by hoes, but at the contrary end of the tables, into waste-baskets. Each girl works by piece-work; and the skins are weighed, that no more than a certain weight of waste shall be permitted,—a per-centage on the whole weight of potatoes sent out of the store. The potatoes are transferred in the tin-lined baskets to a mashing apparatus, with a beater moved up and down by cams worked by the engine, on a revolving table or platform. On this, milk and sweet butter are incorporated, and an attendant moves the potato mash about under the masher with a tinned or plated spade or shovel, and when ready, the tins on tram-carriages alongside, or on racks, are filled, just before the delivery carts are sent out to the public consumer. The tins filled are, of course, the regulation 1 lb., 2 lb., and 4 lb. sizes. Since writing this, I have been told by a tavern-keeper that plain boiled potatoes would not spoil in our tins, judging by his own practice.

24. Alongside our 50-foot cooking apparatus, or projecting further on into other space in our building if more convenient, (and if so we must add one or two more squares 20 X 20 to the building, see plan), is a table 60 feet long, of wood, very solidly made. It is three feet six inches wide and two inches thick, of the best deal, well seasoned. At every five feet a tin vessel, two and a-half feet oval and four inches deep, is let into the table, flush with its surface. Thus we shall have 12 of these tin vessels flush with the table-top or surface. The tin vessels are all connected underneath by a gun barrel or gas-pipe barrel, of iron tubing one inch in diameter, for the conveyance of steam to the tin vessels; the steam so used moves on freely into a condensing cistern somewhere beyond, to heat water for use. The tin vessels form the hot plates on which the enamelled iron dishes are to stand at the time of carving. There will be 10 or 12 joints being carved at once, and equi-distant along the table. When the carving is done, "condense water" is let out of these tins by brass taps or self-acting valves.

25. Between every joint or dish of meat on the table there will be two sorts of special, fixed apparatus. One is for weighing and filling the tins on the left of the carver, and the other is for sealing the meat canisters with a metal seal when filled. The sealer sits on the other side of the table to where the carver stands.

26. I may briefly say, as regards the weighing, that the meat is, as fast as carved, placed by an assistant (expressly not the carver) in a shallow, white enamelled iron dish, on the weighing machine; and the same assistant adds a measure of gravy. As soon as the scale vibrates, the dish, which has a fulcrum forward under it, is tilted, and the spout-like or somewhat funnel-like formation of the front part of the white enamelled iron dish of the weighing apparatus enables the contents to be tilted, funnel-fashion, into the tin canister placed to receive it. All tins of one weight are carved for first. The scale-dish never leaves its place save to move enough on its axis for filling the tin. The tin is then by a treadle moved under the table into position on the other side of the table for putting the lid on, and sealing, by the operator, a boy or girl, at the other or sealing apparatus. The whole operation takes place very rapidly.

27. The secured canisters go on to the tram carriages, which, when loaded with 50 or 100, are sent along the tramway to the cart-loading room. These meat-tram carriages, or all the food tram-carriages, may be walled-in with tin-plate doors, kept bright; and these doors, of which there will be many, will keep the food hot the very short time it will be on the trams, for all the carvers will be filling one tram carriage only at a time, and then it will depart and another will be shunted into position.

28. The mashing of potatoes, and the processes with other vegetables, take place in the same part of the

building as the carving (and simultaneously), but on the opposite side of the 20-foot wide area of operations.

29. In the last square, 20 feet by 20, of our building—marked *n* in the plan, or further on still, for I think we shall want two more squares—I should say the last square on the right hand of the front half of our block of building (160 × 40), the carts are loaded, two at a time. Observe that they are shut in by sliding doors during the loading, to keep the temperature well up. The horses are all ready in the shafts, one strong horse to each cart. Before loading, steam is let freely into the cart by a plaited hemp or suitable hose from our boiler, by a stand-pipe. This steam condenses in the cart body, and, parting with 1,000° of latent heat, speedily warms the cart inside, and drains off underneath of itself. Then the doors of the rear part of the cart are opened and the cart is loaded.

30. I have tried in this paper, so far, to lay down the following points:—

I. Building at Holloway by preference.

II. To work the Islington district or districts first.

III. To have our building as it were a part of a machine, and possessing stated merits peculiar to modern constructions, of a sort not yet sufficiently appreciated.

IV. To have our building in 16 squares of 20 by 20 feet, 8 to the front, and 8 forming the other, or rear half. Front half

A	B	C	D	E	F	G	H
1	2	3	4	5	6	7	8

A B C—Raw materials. . . { 1. Meat.
2. Vegetables.
3. Groceries.

D—Pudding making and filling in.

E F G—Cook-house, carving-house, &c.

H—Loading cart room.

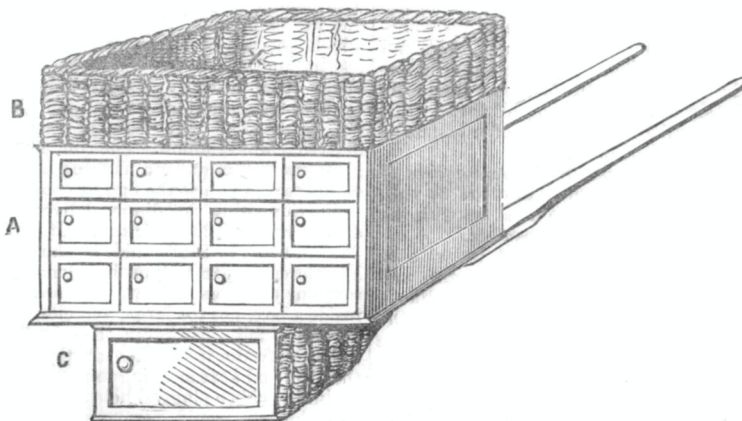
31. The above is but approximate. I want to give the impression which reading the American account of pig-killing and curing establishments in the United States, conveys to the more sluggish (I fear) old-world mind. We read that in America pigs are, so to speak, driven up an alley, are guillotined, and, by some process of legerdemain, in about a quarter of an hour come out bacon, or a good way towards bacon, by the cargo, at the other end of the factory. Raw material goes in at one end of our building, factory, call it what you will, and comes out encased and comforting nutriment at the other end; and this may be all done under the eye of those curious of the public, who like to pay, say 6d. a head, to come in behind a barrier, under certain

regulations and in limited number, to report out of doors that all is conducted in a fair, cleanly, and wholesome manner—which is more, we know, than can be always vouched for below stairs in many great houses, where cook, with arms a-kimbo, defies a mistress to inspect her belongings, and under her despotism considerably more than the proverbial peck of dirt is eaten during the lives of some among us.

32. I must now speak of the delivery carts. I may as well state first that hot canisters of puddings or other food, are handled by the aid of the ordinary thick leather (housemaid's sort of) cleaning gloves, or even thicker if need be. Our carts will be of special construction. They will present the general appearance of the ordinary London Parcels Delivery cart. They will be of wood, lined with 2½ inches of felt, and within that with steam-tight galvanised iron plate, about 20 gauge and 18 gauge shelves. The plate seams had better be soldered. There will be 12 compartments running from back to front, and presenting the section shown in the next page.

The compartments are formed of galvanised iron-plate of the best quality, and perforated in walls and floors of the plates with colander-like holes (for drainage) before galvanizing. The back of the cart will consist of a frame of twelve apertures corresponding with the twelve compartments, and in which frame will be hinged twelve small closely-fitting doors. Each door will be a 2½-in. tin box full of felt, and will have a handle to open and shut the door with a spring catch. When one of the twelve doors is open there is seen a sort of fixed curtain, divided in the middle, a wadded pad, to prevent influx of cold air whilst putting the gloved hand through it to procure one of the twelve sorts of the canistered food (*i.e.*, three sizes of tin and four sorts of food, by multiplication, make the twelve), for every compartment will contain either a separate size or a separate food. The ordinary Parcels Delivery carts have a space beneath the main body of the cart; we shall have this, but separated quite from the food part of the cart. The top of our cart, or roof, will have on it a surrounding wall of basket-work, much as now seen on Nevill's bread carts, but only 18 inches deep. This, and the receptacle beneath, which may also be of wicker-work, varnished if need be, are for returned empty tins, and these will be secured from rattling by tinned wire-work, or basket-work divisions, and at the top by a heavy rug, if required, within the basket over all, to prevent a jingling noise.

A in the woodcut shows the body of cart with the 12 doors and handles of them behind. *n* indicates the basket



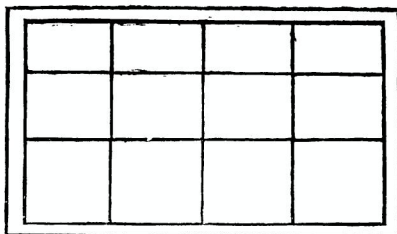
BACK VIEW OF CART.

top, the front (*x*) of which may let down at convenience. *c* indicates the lower receptacle and its door. The back door part of the cart may be japanned in any colour.

33. I reckon that each cart may take enough tins for 50 houses, say 150 tins or more. 600 dinners for families averaging six persons each, will represent the consump-

tion of 3,600 people, and 600 houses to call at. 12 carts, taking enough for 50 houses each, would deliver, between 11 and 1 o'clock, the carts leaving our building at 10.30 a.m.

I have mentioned the perforated plates in the carts. The bottom floor is double-plate with a space for draining, because before each cart leaves our building the very last thing, when all the food is in, and all the doors are closed, it will be inflated with steam (by a hose and stand-pipe, a fixture in the factory), allowed to blow off pretty freely. This will speedily bring up lost heat in the tins inside, and the carts will drain well with the motion over the roads. I don't think hot air would do for this; if so, a hot blast by a Lloyd's fan and twisted gun-barrel, in a small stove, would be a means of furnishing dry heat, which might be regulated by a thermometer behind a glazed slit in the wall of the cart. We know, moreover, that an ordinary dinner plate, or any solid object, appears to be instantly heated if plunged in hot water, or if subjected to steam at any pressure,—more rapidly than in an oven of high temperature. Each cart would require an injection-nozzle, or opening, for what I term the inflation, and this would be closed by a plug or screw.



SECTION OF CART.

34. Our carts will therefore leave our establishment with their body, or bulk, or contents brought up to 212°, and well jacketed in 2½ inches of felt, baked sawdust, or other suitable non-conductor, with doors arranged to prevent influx of cold air, and the compartments curtained inside with felt, for winter or March winds.

35. Each cart has a driver and conductor, as in the case of the London Parcels Company, and the conductor must be an active, steady man, neat and respectable in appearance. I think he should wear a jacket of some dark-brown hempen fabric, capable of washing, and tight at the wrists. Such a material I have seen for the gaiters of shooting-boots and Volunteers' leggings, somewhere by Charing-cross,—strong, soft, warm, neat, and capable of being cleaned. There will be nothing in our arrangement of the tins which will soil either the inside of the carts, or the sleeves of the men; all that will be visible in this respect will be the exterior of canisters as bright as if they contained bonbons.

36. The carts take with them, filed counterparts of the tickets of the consumers on whom they are to call, arranged in order; the printed spaces filled up with the sizes and sorts to be delivered to each consumer.

37. A sort of limp portfolio will hang at the side or rear of each cart; limp leather lined with baize and partitioned inside, and yet capable of opening like a book. This has four spaces, and is for holding the canisters at the time of delivery. It hangs bottom up on the cart, for fear of rain.

38. I must refer you to my original statement in your *Journal* of the 15th November (a printed copy of which statement I can furnish if required), for some particulars relative to district offices or agents—the respectable shopkeepers of the neighbourhoods where we shall operate. These agents, I said in that statement, will keep books like those banker's cheque-books having three cheques in a page. In giving orders, the agent, after recording

particulars in the ruled-off printed spaces, will tear out one portion for the consumer, will keep a second portion, and one portion will go to head-quarters the same evening by a collecting clerk. Now, inasmuch as we could not supply dinners for over (let us suppose) 3,600 people, it might become desirable to have a dispatch clerk on the look-out during the day—say on horseback—who would stop all receiving of orders at the district offices as soon as much over the limit of our issue was reached. Say at three o'clock the limit is reached, then he rides through the district as he would do to polling-booths in an election, and stays the receipts of orders. At elections the advice is, poll early; our advice would be, order early. I may here remark there are at Islington as elsewhere business establishments where young women and others are employed in considerable numbers, where they would be only too glad to have their dinners from us—and I mention this because I may have appeared to confine myself to retail delivery—where they are so busy they cannot spare time to bother much about dinner at all, and where they fall into ill-health in consequence—places to which young women have to carry their dinners from home, and have them warmed up. To benefit such a class or classes would alone repay generous minds for some reform, and this project of a sort of portable commissariat seems calculated to do so effectually.

39. Each (ordinary householder) buyer of tickets will hire or purchase a felt-lined "Sorensen" box*—a box covered with red cloth, or grained, so as to stand in the hall or passage of the house without disfigurement. These may vary in price, say from 7s. to 20s. each, or may be had on hire at a small monthly payment. Large establishments would have a larger box.

40. The conductor of our cart will knock a postman's knock, on delivery, and will give 45 seconds to have the door answered. He may carry a small reversible sand-glass attached to a chain or ribbon round his neck, and reverse this when he knocks or rings, keeping it in his waistcoat or outer jacket pocket; he will then know when to leave, for the sand will go on running out as he stands. Time at such moments is very deceptive, and some rule of this sort may seem puerile, but may become necessary. A watch would not so well answer the purpose, even with a hand making a circuit on the dial in sixty seconds.

41. The servant of the house will answer the door with the voucher, given by the district agent, in her hand; she has taken it from the inside of the lid of the box in the house passage; the conductor compares it with the one he has taken off his file and holds in his hand; as the spaces are printed—ruled off like a small card almanack, printed in squares—comparison is the work of a moment. The conductor opens the box in the house passage, takes out the empty tins, and puts in the box the full ones, which he has brought with him in the portfolio of leather and baize; the conductor shuts and hasps the box. The servants cannot tamper with the meat-canister on account of its seal, and the other cases cannot be meddled with because they are quite full, and detection would follow. The conductor files the voucher given up to him under a hanging leather flap on the side of his cart, and also the one he compared.

42. Supposing the dinner delivered at 11 o'clock, and dinner required at 3 o'clock. It is delivered hot, say 200° to 206°, or 212°—and is shut up in the box, and Mr. Sorensen can tell us how long it would keep hot—say four canisters: meat, potatoes, greens, pudding—inside a box, not too large, and closed in a 2½-inch jacket or wall of felt. However, the servant can pour a kettle of boiling water if she likes into the box, if it is lined with thin tin, and next morning this may be drawn off through an india-rubber plugged hole in the side of the box; for this the box would permanently stand at least eight inches from the ground, to allow this drawing off. If boiling water were used, the inside of the lid of the box

* This box would be an adaptation of the principle of the Norwegian cooking apparatus described in the *Journal*, Vol. XV., p. 664

would also require metal lining, or the felt would get damp. This metal won't interfere with the heat. Two teaspoons of boiling water will warm an ordinary teapot. For supper purposes, or where dinner is unusually late, the tins of food may be placed in a vessel, with some water in the vessel, and the vessel covered. This may be placed over any sort of fire, and the steam or boiling water will raise all to a proper temperature. As the water will be quite clean the supper plates may be inserted in the vessel just before serving up, as without a hot plate one cannot well have a hot dinner. A boil up will steam-heat or water-heat the plates. I try to look at matters practically. We should give out to customers printed instructions.

43. The returned empties placed in the portfolio will be put on top of the cart, or in the receptacle beneath it, and the portfolio reversed will hang on its hook at the back or side of the cart; in the rear above the wheel, if at the side.

44. All this will take a shorter time than the description of it. I would, were I manager of our establishment, drill each new conductor before he went out. I have had workmen who, set to new processes, have said, "We can't do them in the time," and have replied by taking off my coat and doing the thing required to be done, and I have then replied, "What I can do I think you can do." I would let a conductor go through a rough drill, for it is astonishing how stupidly some untutored people set about the most ordinary proceedings.

45. If returned empties cannot be got in "to time," we must send for them early in the morning. The baker's sort of hand-barrow would do well for this; but if we print a notice urgently requesting no delay, and paste it on each box hired from district agents, many, and perhaps most people will oblige, and those who will not answer the street door may go without their dinner.

46. The back of our building (for I have only described one-half of it) is appropriated to stabling—stalls for 12 to 18 horses, cart space, harness, fodder, and water-hose for washing down carts with the water-brush well known, and other arrangements. I believe Thorley's food for horses may be good; some of our waste may be good for them. I don't know. Iron and glass will absolutely hermetically seal off all ammoniacal vapour from coming from our stables to our kitchens, and indeed, if not, we can erect a special building for horses; but I don't think it will be wanted, as our horses will be at the other end of building.

47. The rear of our building will also contain counting house, manager's room, clerk's room; also scalding tin and tin washing room, and tin store room for new and spare tins; also tool-maker's and engineer's shop, and tin setting up and repairing room, where bruised tins will be set straight or rectified.

48. Returned empties are to be scalded in a wooden vat, where water is laid on and the water may be drawn off. Then the tins are brushed in the following apparatus:—A vertical spindle brush, revolving through a stuffing-box in a sort of tub. The tins are cleansed by being put over the brush one by one. The brush revolves at proper speed, turned by the steam engine by a belt over the wheel. The dirty water runs away through any sort of india-rubber valve or through a tap, and water runs in from a cistern of soda and water. Vertical spindle brushes revolving in a larger tank might be better than as arranged above. The principle is obvious.

49. Our scrubbed tins will be rinsed and inverted on galvanized or wood racks having a drain floor below; these are obvious arrangements. All new tins will be scalded before issue. All tins will be kept bright on the outside. In the common milk-can, by the way, we have a good example of a tin vessel for its special service.

50. The rear of our building, if any part can be called the rear, will also contain the engine and boiler-house, bricked in where necessary; also coal and wood stores; water cisterns, unless water is on at a pressure from the main; also surplusage stores, viz., returned full tins,

which I will deal with presently; also mop and broom-house; lavatories; waiting-room; watchman's, or "general," or servant's, or workman's room, &c., &c. Please mark; that the nature of our building is such that a few castings and some strips of glass, &c., and we can add on a 20-foot square at any time. There is a cement used for aquariums which might also answer for iron and glass buildings:—Take one gill of litharge, one gill of plaster of Paris, one gill of fine white sand, one-third of a gill of fine powdered resin; sift and keep tightly corked until required for use, then make it into a putty with boiled linseed oil. It can be used for marine or fresh water aquaria. Let the tank dry three or four hours, when it will be fit for use.

51. In commencing the undertaking referred to in this paper, the building and plant might be got ready while the neighbourhood where we were going to operate was canvassed from house to house, by persons employed on commission and instructed how to place the facts before those we should desire to benefit—in other words, the consumers. We should have the benefit of the local journals, such as the *Islington Gazette*, which is respectable, old-established, and has a considerable sale. We could state facts, and show advantages (I would do so, if no one else), at Myddelton Hall. We might send the first two or three dinners round gratis, for prejudice might exist where in that way it would be dispelled. As soon as we have a sufficient number of prospective customers we can fairly commence. Our district agents would have boards outside their shops, such as the Parcels Delivery Company instituted.

52. On a smaller scale than I have named, even for a commencement, I don't think the project could be well and satisfactorily done.

53. Mr. Corbet, of the Glasgow Dining-rooms, told me that he gives a very fair dinner for 4d., and has to find a good room, and warmth and cutlery, waiters, cloths, condiments, rent of room, repairing furniture, &c., &c., all in the 4d., and yet a profit remains. Setting our costs against the above costs, we can provide a good dinner (a better one, of course) for six persons for 8d. a head, consisting of meat, potatoes, greens, pudding, all of the best, and thoroughly hot.

Say the prime cost per head, of raw material, would be:—

Meat	3d.*
Potatoes	0½d.
Greens	0½d.
Pudding	1½d.

Dinner 5½d.

That is to say, prime cost of materials, 2s. 9d. for six. Charge 4s. (say for six) or 8d. a head for such a dinner—plenty to eat for every body of the six—to eat and to spare.

54. Calculation (approximate).—600 dinners for six (say average), or 3,600 people charged 8d. each, or 4s. for six, is £120 daily.

Now, in charging 4s., we added 1s. 3d. to 2s. 9d., the prime cost of the food. This gives £37 10s. daily received, in excess of what we pay for food.

We have the following expenses per day:—

Coals, 1 ton (I am assured I am exceeding) ..	£1 0 0
12 conductors, 12 drivers, 21s. a week each ..	4 10 0
18 horses' feed, or less (Thorley's)	2 0 0
(14 horses might suffice.)	
Commission on sale of tickets	3 0 0
20 young women, 10s. a week each (we give them a dinner each)	1 10 0
12 carvers, 5s. a day each	3 0 0

* If this seems little, it must be remembered that children do not require much meat, and that Mr. Corbet charges only 4d. for the whole dinner, and that we shall buy in the cheapest market—not the cheapest London market, but the cheapest accessible by rail or telegraph. I am speaking of prime cost to us.

Weighing and sealing canisters, 24 young people, 12s. a week.....	2	8	0
Cooks, engineer, stable-hands, &c., say six at 5s. each	1	10	0
4 clerks, 6s.	1	4	0
I think, by changing about, these hands would be more than ample.			
Gas, water, wear of plant, rent, insurance, interest on money, manager, waste, bad debts.	4	0	0
	24	2	0
	37	10	0
	£13	8	0

Add (if you like) another £3 8s. for contingencies, such as telegrams, stationery, and innumerable matters I cannot now recollect—£3 8s. daily. This will leave £10 net profit per diem on a capital of £7,000, or £3,720 a year net profit. It sounds enormous, but is consequent on—

55. Our absence of system of credit. Our "quick returns." Our organization for prevention of waste.

56. Our £7,000 capital would be thus laid out:—

*Building	£1,500
Cooking Apparatus	800
Sewer arrangements and foundation	200
12 carts, at £60 each	720
18 horses, at £40 each	720
600 boxes, felted	300
4,000 canisters, at 1s. each ..	200
Engine and boiler, &c.	250
Machinery	300
*Ground (premium)	250
Fence round building, } gravel, fittings, &c. }	300

Total £5,540

Leaving us a balance at the bankers of nearly £1,500.

57. With a larger capital we might safely attempt a bill of fare more elaborate, and could produce wholesome varieties of made dishes, under the public eye (if they chose to pay 6d. to come in, as I have said, under regulations), which would create some surprise for their excellence and cheapness; this because of using condiments or materials in bulk, a hundred lemons instead of a quarter of one, and so with spice, or preserves, &c. With regard to excellence of flavour, cookery is essentially a science, and it is an absurd waste of time for a *chef* to be using high faculties over a dish for a few. Such science expanded over quantity would obviously be better spent; and it is needless to add, as the inference, that excellence of quality and flavour would be a consequence of measures of magnitude wisely conducted. A larger capital would be necessary; and quite as exact but a different organisation would be required. However, this last is premature. But it would not do to depart from organisation. To do so would inevitably cause eventual bankruptcy.

58. Take the American hominy, a food I can get as cheap as rice, and as much better than rice as wheat is better than rice; take the potato patty, such as I have eaten in Bombay. The potato patty is of mashed potatoes, and looks like a dinner roll when fried, but it has juicy meat (fresh meat minced) inside it. I have an arrangement by which this could be made in thousands by machinery, and put into tins carefully with gravy. I know the demand would be very large, it is so good and wholesome. The remains of meat on our joints from the carver could be taken off by girls with keen knives, and then minced for these patties by machine.

I may remark that I have an appendix of details to add sometime to those I have described.

59. My own opinion is, that the whole project to which this paper refers hinges entirely upon organisation

* Estimate by an architect.

If principles laid down at first are violated six months after commencing an undertaking of this sort, then it will fail. How could the General Post-office, or Huntley and Palmer's Biscuit Factory, or even that little affair of Watling's pork pies (a paying business), possibly succeed unless conducted on system? I dare say most readers will think my bill of fare a very plain and unsatisfactory one even to commence with, but we have to provide for the million, who eat to live, not the thousand who live to eat. We will think of the latter afterwards. We cannot too rigidly do everything by "rule and plummet" in the project I have ventured to place before you.

60. One word in conclusion:—Mr. Newman Hall quotes a Government report, that fifty millions sterling are annually spent (or were in 1849) in the United Kingdom on beer and spirits; spirits twenty-five millions and beer twenty-five millions. Mr. Hughes, M.P., writes me that better and warmer food would do more than anything else to expel the "demon gin." (I have his letter.) Mr. Stuart Mill writes me from Avignon, saying—"Waste is enormous. Your objects therefore have my entire sympathy." Mr. Chester wrote me—"I see no weak point in your project." Regarding this vast outlay on inebriating beverages, it is easy to enter a public-house and get beer and gin, but is it easy to enter a public-house and expeditiously get a warm and plentiful wholesome meal?—I have not found it so, and I have knocked about a good deal. Can it then be doubted that if we can bring steam and coal, and organisation and machinery, to bear on this question of food, we strike a blow at intemperance and immorality at a critical period in our history?

I may add further extracts from letters received from Mr. J. Stuart Mill, M.P., and Mr. Thomas Hughes, M.P.

Mr. Mill says:—"Every one must see that whatever enables food, or the other necessities of life, to be obtained of better quality and at less cost, must be good, not only for the economical interests of the country and mankind, but for all their other interests. It is also well known that there is enormous waste in the preparation of articles for domestic use; and there is no item of expense in which the waste is more conspicuous than in that of fuel. Your objects, therefore, have my entire sympathy."

Mr. Thomas Hughes says:—"I am obliged by your letter, which has lain so long unanswered in consequence of my absence from home. I am glad to find you working at the problems to which you call my attention, and which are indeed the most pressing for us in England. I wish I could give you any efficient help, but unfortunately I have my hands so full already that it is impossible for me to undertake anything more. As to the 15th of this month, it is out of my power to make any positive engagement, as our Courts are sitting and I have many other calls on all my spare time; but I will come to hear your paper at the Society of Arts if I can. All you say as to the drunkenness of our city poor is too true. I feel that if we could only wash and feed them properly the gin demon would soon be powerless. Wishing you every success in your work, I am, &c."

DISCUSSION.

The CHAIRMAN, in inviting discussion upon the paper, said it was almost needless for him to remark that a great deal of time had evidently been bestowed upon it in endeavouring to make the scheme as perfect as possible, as shown by the minute details which had been given. But the point on which he chiefly invited discussion was, as to the feasibility of conveying hot food for consumption in the way suggested. There could be no doubt of the advantages of some such system as had been propounded, in neighbourhoods where large numbers of people were engaged in various manufacturing branches, and who had not time or means for the proper preparation of their food. That was one of the most important points to be considered. Members were

aware that for some time past there had been sitting a committee of the Society on the subject of the supply of food to the people. At one of the sittings of that committee the proposition of Mr. Riddle was brought before them, and it was then suggested that that gentleman should embody his ideas in a paper to be read before the Society, in order that the proposal might be ventilated by discussion.

Mr. G. WARRINER remarked that, probably, there was no person in the room who had sent out a larger amount of cooked food than he had done, especially in Dublin, during the period of the famine in Ireland. On that occasion he supplied rations of Indian meal and rice in a cooked state for 26,000 persons per day. The food was sent out hot, before twelve o'clock, to the different wards of the city, and thence distributed to those who applied for it. This proved that there was no serious difficulty in sending out hot food. By the use of Capt. Grant's waggons he had sent cooked provisions from Aldershot to a distance of several miles, and they were distributed to the soldiers hot, and in excellent condition. These waggons were similar to those which were sent to China, and there was no difficulty in sending cooked food in that way to almost any distance. With regard to the scheme now proposed, he feared it was surrounded by many difficulties, but if it could be carried out, it would be a great boon to the class of society to whom it was suggested to apply it. Even if some of Captain Grant's waggons were employed in the east of London at the present time in the distribution of pea-soup, such as was prepared by Mr. McCall, at Whitechapel, and sold at one penny per quart, it would be a great boon to the district. Captain Grant's waggons could, no doubt, be obtained, as there were a large number of them laid up in the arsenal at Woolwich.

Mr. S. REDGRAVE thought the chairman had touched upon the real point for discussion, viz., the practicability of distributing the food in the way that had been proposed. They could scarcely entertain the idea of carrying it from house to house, and expecting the call to be answered, and the provisions delivered in the way described, in the space of only 45 seconds! It certainly would be a great boon if they could carry food cooked to the doors of the middle and poorer classes, but at present he could not see the practicability of Mr. Riddle's scheme, although it might look well on paper. At Glasgow they had the example of a good meal being supplied at the charge of 4d.; Mr. Riddle's charge was double for the food he proposed to supply, and he had put down a margin of profit on the working of the concern which was excessive. These were some of the points which occurred to him as being worthy of consideration.

Mr. BORTLY said the point which most struck him was the large disparity between the charge for the Glasgow dinners, with all accommodation provided for the visitors, and that which Mr. Riddle proposed. Although 4s. might not be too much for the middle-class to pay for a dinner for six persons, yet it would be beyond the means of the class below them, whom it was especially intended to benefit, and that class included the great mass of the population. He questioned, moreover, whether even the middle class would like to pay so much as 8d. per head, which, according to the calculation given, left a very large profit. If Mr. Riddle could supply a good dinner at the Glasgow prices, it was a thing which every one would be inclined to support. With such commercial results as had been pointed out by the author, there would be no difficulty in procuring the necessary capital, but it carried with it the idea of too much profit taken from the class of people whom they wished to benefit.

Mr. CAMPIN did not gather whether Mr. Riddle had made provision for ventilating the compartments of the food carts, for if vapour got to the food and there were no means of letting fresh air in, the effect would be injurious. There was, no doubt, a large expense in-

curred in carrying out the plan of distribution by means of horses and carts, involving a driver and attendant to each; and it struck him that the dinners might be supplied at less cost to those who would send for them and take them away in their own vessels. This plan would no doubt be of extreme benefit to many classes of society, because there were persons above mere labourers, whose time was so engaged that they were not able to give that attention to the preparation of their food which was desirable for their proper sustenance. People often ate cold food when they might have hot meals at the same cost, and probably this scheme might meet the wants of the classes above the mere labouring class, who were able to pay something like a fair price for their midday meal. Whether the charge of 8d. was not too high was a question. He thought it was; and that Mr. Riddle would find that price detrimental to the success of his scheme.

Mr. RIDDLE remarked that Mr. Corbet gave a dinner for 4d., but he (Mr. Riddle) had mentioned the arbitrary sum of 8d. for a dinner of a totally different kind. In Mr. Corbet's charge were included the furnished rooms, waiters, table-cloths, knives and forks, wear and tear of plant, breakages, &c. These he (Mr. Riddle) put against the expenditure involved in the system of distribution. Further, with regard to the charge of 8d., he could say he did not contemplate going to a very low class of the population at the outset. The system might ultimately be extended to reach the means of the very lowest classes, but he did not think it would do to go to them at first. They did not go to the lower class for fashions; these came from the higher classes, and they must get the intelligent classes to recognise this project before they could get the uneducated classes to adopt it at all. The lower and most uneducated classes were at the present time—as in all periods of our history—naturally suspicious of any new thing; and if a project were started on a large scale for supplying them with food on a plan similar to this, there might be a suspicion that public aid was given, either by the Government or from some other source, and with the natural independence of Englishmen they would be apt to reject it altogether. He was well acquainted with Islington, and he knew scores of instances in which this particular project would be very serviceable. He was told a few days ago of a large establishment for the manufacture of artificial flowers, where the females employed took their dinners with them, and either ate them cold or got them warmed in the best way they could. If they could take dinners to such persons as these ready cooked for eating, he conceived that it would be a great advantage. He repeated he had put down the sum of 8d. for such a dinner as he proposed to give, and he thought they could hardly give a good and satisfactory dinner of roast or boiled meat, of good quality and plenty of it, good pudding, and a good quality of vegetables, for a less sum than that. If, however, the price were reduced to 7d., as possibly it might be, the projectors must be content with less profit, but at the charge he had stated the profit came out as he had calculated it. As to the parties going to dining-rooms, as at Glasgow, that was out of the question, because the people to whom his system would most apply were the families of those who were engaged in daily occupations away from their homes, and the mother could not take her children to a dining-room every day for their meals.

Mr. CHARLES HART said the Society was indebted to Mr. Riddle for having brought this important subject before them so much in detail. Upon the probable success of the project he would not offer an opinion, but it was obvious that the people required to be educated to it. He was glad to hear that it was not proposed to confine the price to 8d., but that figure was mentioned as leaving a profit to the concern of some £3,000 a year, which might be an inducement to people to invest money in it. He had personally tested the Glasgow dinners, and could

state that they were very good for the money, and the general arrangements were most satisfactory. He thought this project commended itself to the support of all well-wishers to their fellows. It would supply a great want of the present day, and, if it proved a success amongst the class to whom it was proposed to apply it in the first instance, it might probably be extended to a still lower class of the people, to whom it would be of the greatest value.

The CHAIRMAN said, whatever difference of opinion obtained in the meeting on the subject before them, the Society always felt indebted to gentlemen who occupied themselves in giving useful information on any subject of public interest, and he was sure they would all accord their hearty thanks to Mr. Riddle for the paper he had laid before them. Before putting this motion, there were one or two points which he would briefly notice. Many years since he was asked to meet the late Dr. Lardner, at an extensive building erected on the Thames Bank as a baking establishment, but that proved a failure. They did not attempt to send out any cooked food; they only proposed to supply bread to different parts of London, and those who had that bread could not get their victuals baked for them by the bakers of the locality. Perhaps of all things in which the poorer classes were most deficient, that of the proper dressing of food was the greatest. In France the labouring population succeeded better in this respect. By means of the universal *pot-au-feu* a very savoury and good soup or stew was readily concocted; but out of Spitalfields, perhaps such a thing did not exist in this country. Therefore, to improve the means of cooking food, for those classes who do not possess adequate appliances of their own, would be to effect a great good, and, if the proposed scheme was successful, it might be extended to meet the requirements of a lower class of society still. The whole question turned, as he suggested in the first instance, upon the practicability of delivering the food on the plan proposed. It would be a pity, in starting the scheme, to start it in a neighbourhood where there was not a fair probability of obtaining sufficient customers. It was shown by what had been done at Aldershot that, to a certain extent, this plan was practicable, and had been successful. It had also been shown that Mr. Corbet's system in Glasgow was eminently successful, but it was only right to mention that a similar system attempted in London had failed, probably from not having a Mr. Corbet to manage it. If it was thought that the details of this plan were numerous and lengthy, it should be borne in mind that upon the completeness of the details the success or otherwise of the whole scheme depended. He was sure they would join him in a vote of thanks to Mr. Riddle for his paper.

The vote of thanks having been passed,

Mr. RIDDLE offered his acknowledgments for the patience with which the lengthy details of his project had been listened to by the meeting, but, as the chairman had said, the value of the scheme entirely depended upon its details. With regard to the point as to the time to be allowed for delivery at each house, probably Sir Rowland Hill would be able to tell them what the average time was in the delivery of letters. It was certain that the postman delivered a great many letters in a short time, and he thought 45 seconds was not too short a time for answering a call; it was often that a knock was answered more quickly than that.

SCIENCE SCHOLARSHIPS.

The following important minute, establishing local scholarships for science throughout the country in elementary and other schools, has lately been issued:—

At Whitehall, the 21st day of December, 1867, by the Right Honourable the Lords of the Committee of Her Majesty's Most Honourable Privy Council on Education. Present—His Grace the Duke of Marlborough, Lord

President of the Council; the Right Hon. the Lord Robert Montagu, M.P., Vice-President of the Committee of Council on Education.

SCIENTIFIC INSTRUCTION.—LOCAL AND CENTRAL SCHOLARSHIPS.

My Lords consider the subject of scientific instruction with a view to its further encouragement and diffusion.

1.—They refer to the Science Directory of the Science and Art Department, and to the minute of the Education Department of the 20th February, 1867, making additional grants for secular instruction to elementary schools.

2.—In order to assist the artisan classes who may show an aptitude for scientific instruction, my Lords resolve to aid local efforts in founding scholarships and exhibitions. The scholarship is intended to maintain the student while remaining at the elementary school, and the exhibition to support him while pursuing his studies at some central institution where the instruction is of a high grade.

3.—*Local Scholarships.*—These are of two kinds, the elementary school scholarship and the science and art scholarship.

4.—*Elementary School Scholarships.*—The Science and Art Department will make a grant of £5 towards the maintenance of a deserving student to the managers of any elementary school who undertake to support him for one year, and subscribe also at least £5 for that purpose.

5.—*Conditions.*

a.—With any number of scholars up to 100 on the register of the school there can be but one such scholarship; above 100 and up to 200 two scholarships, and so on for each 100.

b.—The scholarship must be awarded in competition to the most successful student or students in some examination of the school. The absolute terms of the competition and the award of the scholarship will be left to the managers of the school, subject to the approval of the Science and Art Department.

c.—The scholar must be an artisan or poor student, as defined by the Science Directory, and be between 12 and 16 years of age.

d.—He must not be the teacher, pupil-teacher, or other paid servant of a school.

e.—He must continue regularly to attend the day school and—

f.—Pass in some one or more branches of science at the succeeding May examination of the Science and Art Department, after which the Department grant of £5 will be paid.

6.—These grants will be made from year to year on condition that the student each year pass in a new subject or in a higher grade of the same subject in which he first passed. It will be for the locality to determine for how many years the student may hold the scholarship, but in no case can he be allowed to hold it for more than three years.

7.—The Science and Art Department will hereafter consider such alterations in these conditions as appear necessary.

8.—*The Science and Art Scholarship.*—The Science and Art Department will make a grant of £10 towards the maintenance of a student at an elementary school who has taken a first grade in freehand or model drawing and elementary geometry (see Art Directory), and passed in one of the subjects of science (see Science Directory).

NOTE.—By elementary school is understood any school where elementary instruction is given, whether aided by the State or not.

9.—*Conditions.*

a.—With any number of scholars up to 100 on the register of the school there can be but one such scholarship; above 100 and up to 200 two scholarships, and so on for each 100 scholars.

b.—The scholarship will be awarded to the most successful student or students in the school.

c.—The scholar must be an artisan or poor student, as defined by the Science Directory, of between 12 and 16 years of age.

d.—He must not be the holder of an elementary scholarship, the teacher, pupil-teacher, or other paid servant of a school.

e.—He must continue regularly to attend the day school, and—

f.—Obtain at least a third class in the same subject of science in which he had already passed, or pass in some other subject.

g.—In each year of holding the scholarship he must pass either in a higher grade of the same subject or in a new subject.

10.—*Local Exhibitions.*—The Science and Art Department will make a grant of £25 per annum to the managers of any school or educational institution, or any local committee formed for the purpose, who will raise the like sum by voluntary contribution for the maintenance of a student at some college or school where scientific instruction of an advanced character may be obtained. The exhibition may last for one, two, or three years.

11.—*Conditions.*

a.—The exhibition must be awarded in competition in one or more branches of science at the May examination of the Science and Art Department. The managers may select any branch or branches of science for the competition, and if more than one be taken, they may fix any relative amount of marks they consider best to assign to them.

b.—The place where the student is to pursue his studies may be fixed by the managers, subject to the approval of the Science and Art Department. If a government institution be selected, such as the Royal School of Mines or Royal College of Chemistry, London, or the Royal College of Science, Dublin, the fees of the student will be remitted.

c.—The exhibitor must be of the artisan class or poor student, as defined by the Science Directory.

d.—The grant of the Department will be paid from year to year, on condition that a like payment has been made by the managers or local committee, and that the student has pursued his studies satisfactorily, according to regulations fixed by the Department.

12.—Transmit a copy to the Treasury, and request sanction to provide in the estimate for the increased expenditure likely to be occasioned by this minute.

TECHNICAL INSTRUCTION AND METROPOLITAN PUBLIC SCHOOLS.

The following copy of a letter from Mr. Ayrton, M.P., addressed, some time since, to the President of the Council, respecting Metropolitan Public Schools, has recently been published:—

To the Right Honourable Lord Granville, President, &c. &c.

MY LORD,—I avail myself of Mr. Bruce's suggestion to place before you in writing my views respecting the Metropolitan Public Schools, which have recently been the subject of inquiry. As you have doubtless read the Report of the Royal Commission on these schools, I will only notice very briefly the leading facts which are set forth at length.

1. Westminster School has no separate endowment, but is maintained at an expense of about £2,000 a year out of the funds of the Dean and Chapter of Westminster, which now amount to £60,000 a year. The school buildings and playground are provided free. The school is a mixed boarding and day-school. About 130 boys receive a classical education, 40 of them being also maintained. These 40 boys pay £17 17s. a year for their education, the others £26 5s., and those who board pay £68 5s. a year in addition.

2. St. Paul's School is supported by an endowment vested in the Mercer's Company, now producing a gross income of £9,500 a year, which will in a few years be greatly increased. The school buildings are free. It

is exclusively a day-school, at which 153 boys receive a classical education without payment.

3. The Charter-house is maintained out of the endowments vested in the governors, amounting to about £22,700 a year, of which about one-half may be applied to the purposes of the school. The buildings and playground are also provided free. It is a mixed boarding and day-school for a classical education; 44 boys are maintained and educated free, and the other boarders at a charge of £80 to £90 a year.

4. The Report notices the great difference between public schools in London and in provincial towns, but without entering fully into all the circumstances, and arrives at this conclusion:—"Archdeacon Browne is of opinion that in order to maintain a large school in London, it must be made principally a day-school, and that everything must be sacrificed to the day-school principle. We are disposed to concur with him in this opinion, and to deduce from it the conclusion that as day-schools are what London principally wants, the course which would be most for the interests of London would be to improve and enlarge the schools which are to be treated as day-schools, and to remove the boarding-schools to a distance."

5. Nevertheless, the Report, instead of treating the question of Metropolitan Schools in a comprehensive manner, as a separate question, on the basis which it rightly suggests as the true one, mixes up the Metropolitan and Provincial Schools in its general recommendations, without distinction. Had the Commissioners fully investigated the grounds of the importance of day-schools in the metropolis, it would have been made apparent why they are so much desired. I will only notice those grounds shortly.

6. In London there is a very large professional class, and also a very large class of residents, who desire to qualify their sons for professional and other intellectual pursuits; but the professional class consists, to a great extent, and the other class to a much greater, of persons unfortunately possessed of very limited means. They are compelled to keep up a certain establishment at a much greater expense relatively than in provincial towns or in the country; they cannot contract and expand this establishment as their children may be absent or at home. Thus the cost to them of their children at home is mainly the expense of the additional food, and even this extra expense is in some measure compensated for by their being able to keep a more comfortable table. A comparison of all the heads of expense would show a considerable balance in favour of children living at home, even as compared with boarding at the cheaper schools. But it would seem from the facts stated in the report, that the cost of maintaining pupils as boarders at the public schools is so great, or the charge for it so high, that none but the more wealthy can afford it. In addition to the sum charged for boarding at school, there are contingent expenses of a considerable amount.

7. The number of persons in the metropolis to whom these remarks apply cannot be easily estimated, but I believe it amounts to many thousands; and the question I now wish to submit for your consideration is, whether it is not desirable to deal with the public schools in the metropolis in a manner which will best meet their case.

8. There are not only all the great public schools, but there are numerous other grammar schools in all parts of the metropolitan counties, some of them, like Tonbridge, well endowed, which can be resorted to with great facility. Many of them admit of considerable extension; and they may be regarded as sufficient to satisfy the wants of those who can afford to send their children to boarding-schools. No necessity exists for adding to the number of endowed boarding-schools in the provincial towns or rural districts.

9. After making due allowance and deduction from the gross amount of the endowments, every one must be

struck with the slight impulse given to education, and the trifling results which accrue from the large resources of the public schools in question. The increase of their endowments is chiefly due to the great increase of the metropolis, but no attempt has been made to improve their establishments in the manner best calculated to meet the wants which have been created by that increase. The fact that such institutions as King's College and London University Schools have been established by voluntary support, and have been eminently successful, is a cogent proof, no less than the City of London School, both of the nature of the want and of the propriety of the reform which I venture to suggest.

10. Unfortunately these unendowed schools, like Cheltenham, and all similarly formed institutions, are compelled to resort to the practice of affording a diversified education, because they are obliged to humour the wishes of their various supporters. At the same time they have not resources enough to provide separate schools for the rival claims of those who want classical, and those who prefer what is called modern education. It is only by taking advantage of the resources of endowments that this unwholesome tendency may be combated, and a sounder system introduced.

11. The amount charged to students in these new institutions is but little more than the average of that paid at Westminster. This shows how little the public benefit by the present system at the great endowed schools.

12. Already attempts to deal with this question piecemeal have been begun. The Trustees of the Charterhouse propose to submit a Bill of their own next session. Considering the relations of the Ecclesiastical Commission to the cathedral funds, we may expect some further isolated arrangements respecting the endowment and management of Westminster School. But if regard be had to the enormous increase of these funds, may it not be fairly asked whether the school is not entitled to some share of the increase, which is admitted to be beyond the ecclesiastical requirements of the cathedral?

13. I would propose that all the three London Schools shall be dealt with in a comprehensive manner, with the view of providing day-schools of the highest order.

14. In treating of the nature of the education which should be carried on in the public schools, the report directs attention to the question of modern education, and suggests that various subjects should be grafted on the scheme of classical education now prevailing in the grammar schools. This suggestion is entirely at variance with the views contained in Mr. Gladstone's letter, which clearly points out the dangers and evils likely to flow from this kind of rivalry between two systems of education when brought into conflict in the same school.

15. Whilst the evidence shows that the majority of the pupils are unable, within the limits of the ordinary school opportunities, to compass a moderate education in the two dead languages and mathematics, the report proceeds on the assumption that boys possess an almost unlimited capacity for learning. It assumes that the schools are maintained for the benefit of the few who are gifted with remarkable genius and ability, instead of the many of average intelligence, while not a few are below the average.

16. The introduction of more than one system of instruction into a school appears to me to be an arrangement which may be excused as a misfortune when the necessity for it exists, but which should be carefully avoided as an evil when the necessity can be obviated by a more suitable management.

17. In the metropolis the number of boys requiring different kinds of education is so great that there would be no difficulty in filling many schools of different kinds, if the schools were the best adapted to their circumstances, and were conducted in such a manner as to inspire the public with confidence that they were the best of the kind.

18. Instead of attempting to teach anything and everything in one school, I should propose to divide education into two entirely separate systems, to be carried on in separate schools—the one the existing classical system, and the other the modern system. I need only remark of the former, that I do not now propose to modify it, for any improvement of which it may be susceptible would not be peculiar to the London schools.

19. I do not, however, use the term "modern education" in the sense in which it is so often understood, as mere instruction in modern knowledge, for I see no reason why education should not be conducted on the basis of modern languages with as much accuracy, mental training, and discipline, and with as much regard to all branches of literature, as on the basis of dead languages. Whether English, together with French, German, or any other living language, should be taught, or after one language has been partially acquired, the study of another should be begun—as Greek is commenced after some progress has been made in Latin—are questions of detail to be determined on a careful consideration of many matters which it would be premature to discuss.

20. Admitting that the language and literature of Europe are not in some respects equal to Latin or ancient Greek, the real question is whether any living language, coupled with our own, is a sufficient medium for literature, moral, and æsthetic education. Living language will at least possess this advantage, that its cultivation will be kept alive amongst the classes for whom it is proposed, whilst the dead languages would be buried and forgotten.

21. If a foreign language be taught by educated Englishmen, as I think it should be, it may be objected that it would be learnt with an imperfect pronunciation. But a dead language is learnt with a pronunciation so widely different from that with which it is supposed to have been spoken, that a Roman would have failed to understand the Latin, and an Athenian would have never recognised the Greek uttered in the English schools. It would require no intellectual effort at any time afterwards to correct the defective pronunciation of a living language.

22. Natural science should also be made a basis for the education of the faculties of perception, discrimination, reason, and judgment. It is easy to guard against the degenerating of such an education into the mere acquisition of information, if the beginning be made with inorganic chemistry and the laws of physics, to be taught with precision, and the course ascend to the rigid investigation of physical phenomena and problems.

23. To these studies might of course be added the higher arithmetic and pure mathematics, which, again, could be made the basis of a considerable degree of education, if they were so treated in the schools, instead of being regarded as a kind of adventitious accomplishment, to be acquired at the pleasure of the pupils or in an unsystematic manner.

24. According to my idea, therefore, a modern school is one in which modern language, mathematics, and natural science would be the basis or medium of exact education, and in which the course would be pursued as high as the age of attendance would admit.

25. The study of drawing would in many cases be a necessity rather than an accomplishment, and considerable allowance of time would have to be made for other special acquirements not forming part of the school course of education.

26. I need not advert to religious instruction, as it would continue in the new schools on its present footing.

27. Without doubt, in the metropolis, there are thousands of persons who would be glad to send to such a day school children whose education is at the present time miserably conducted, and, indeed, thrown away, between equally imperfect efforts to pursue a classical

and modern education in combination, within the period of time during which they are able to be maintained at school.

28. The industry and commerce of the country are, I think, actually suffering from a want of knowledge of modern languages amongst the commercial, and of science amongst the manufacturing classes. But if, year by year, a few hundreds of youths could be received into English counting-houses thoroughly instructed in modern languages, and into English factories thoroughly imbued with natural science and mathematics, who would in time rise to be the directors of commerce and industry, a great want would be supplied, and a very great service would be rendered to the whole community.

29. Considering the care that is now bestowed on modern education on the Continent, it is a subject of grave concern whether foreign merchants and manufacturers are not obtaining advantages over our own from their better knowledge of modern languages, and of the principles of natural science and mathematics. In what proportion travelling agents abroad are foreigners, it is difficult to estimate, but the foreign houses established in England for the purposes of carrying on our commerce not only spread themselves through the interior, but constantly increase in numbers; we are frequently surprised at the great progress that is made abroad in various arts and manufactures, due to the science of those by whom they are conducted. It is time that some public effort should be made to place our commerce and industry on an equal footing in respect to education with that of foreign nations. This question concerns not merely the merchant and the master manufacturer, but the millions who are dependent upon the intelligence with which their affairs are conducted. It may be thought that this is an exaggerated view of the subject, but it is better to err on the side of improvement and progress than of indifference and stagnation.

30. Each system of education is not only desired by thousands of persons who have different objects in view, or belong to different classes, but these classes are for the most part grouped together in different parts of the metropolis. West of Charing Cross and the British Museum, the desire for classical education would prevail, while east of that line and on the southern side of the Thames, modern education would be preferred.

31. I would therefore propose that advantage should be taken of the opportunity of reforming the London public schools to deal with them in a comprehensive spirit for the purpose of promoting education in the metropolis. Without now inviting assent to any particular plan, I suggest one rather by way of illustration, in the hope that suggestion and discussion may lead to the development of some scheme which may meet with general approbation.

32. Instead of the funds being employed, to gratify a love of patronage, in the formation of free schools, I would suggest that they should be expended in the solid establishment of schools, and that each boy should pay a moderate sum for his education, until, by the exhibition of superior merit, he became entitled to a free scholarship in the school. The scholarship would then operate as a stimulus to parents to send their children to the schools, and to the boys to obtain it. The effect would thus be much greater than the mere limit of its money value, and the funds would admit of a large expansion of the schools.

33. I consider that the endowments would be sufficient to establish at least six schools, which I should distribute as follows:—

St. Paul's School would remain as at present a central classical school.

The Charter-house would remain as a central modern school.

Westminster would remain as a classical school for the rapidly-increasing district of the south-west.

Another classical school should be founded in the north-west as a branch of St. Paul's.

One modern school should be founded in the north-east, and another modern school on the south-east—that is, on the south side of the Thames—as branches of the Charter-house.

Thus, whilst the general requirements of each district were provided for in its local school, those residents in the district who might desire the other system would be accommodated as far as possible in the central school of that system.

34. A further stimulus might be given to these schools by extending competition for the scholarships to the students of all the schools on the same system.

35. The number of scholarships and fellowships at the universities which have now been thrown open to all students is so great that there seems to be no necessity for appropriating any portion of the school funds to the maintenance of scholars there, which is, in fact, only upholding the evil practices which it was the object of university reform to abolish. At all events, considering the very small number of boys who are in the higher class of a public school, the number of scholarships should be very limited, and should only be granted when a high standard of merit is attained.

36. The report also questions the suitableness of the present governing bodies of the schools, but I think fails to suggest any adequate remedy. If the London schools were treated separately, the means of providing a more active supervision over their educational arrangements could be readily found in the university of London, whose council, being expressly constituted for the purposes of supervising education, could readily undertake the duty of assisting the trustees in the performance of their duty to the public. It would be premature to discuss the precise manner in which this suggestion could be carried out, and, indeed, my present object is not to mature a plan, but to urge the prosecution of further inquiries to ascertain what could be accomplished.

37. I have purposely abstained from noticing Mr. Hare's able report on the Blue Coat School, because it involves very different considerations from those which I have here entertained. That school not having been established for the purpose of giving high education, but for the purpose of educating and maintaining poor children, I regard it as nothing more than an establishment like the orphan asylums. Indeed, it would seem to have been intended to meet the want which is now completely provided for by the separate schools maintained out of the poor-rates. The original purpose of the charity having ceased, the governors have applied its funds for the relief of the poor of the trading and professional classes. This institution might serve a very useful purpose in relieving real cases of distress amongst this class, if the funds were properly administered. I do not suggest that they should be still further misappropriated for the purpose of educating those for whom a gratuitous education is not necessary.

38. I hope, therefore, that the Government will not proceed with any measure which may treat all the public schools on the same footing, but that they will regard metropolitan schools as entirely distinct in their character and circumstances from the others, and will acquiesce in whatever course may be deemed desirable for the purpose of legislating for them in a comprehensive spirit.

39. It had occurred to me that a Committee of the House of Commons might be appointed to take the report of the Commission into consideration, so far as it relates to the metropolis. There is the more reason for adopting this course, as metropolitan views were in no degree represented in the Commission, but in the House of Commons there are several metropolitan members who are peculiarly well qualified to investigate and report on the subject, which they would approach with a due sense of responsibility.—I have, &c.

(Signed) ACTON S. AYRTON.

Commerce.

THE COMACCHIO FISHERY.—The lagune of Comacchio, similar to those of Venice in their mode of formation, occupies an extensive area between the Pô di Volano on the north, and the Pô Primaro, or Reno, on the south, and is separated from the Adriatic by a long sandy spot. This lagune, which is about two hundred and thirty miles in circumference, contains forty basins, surrounded by embankments, each communicating with the sea. These lagunes have from time immemorial been celebrated for their fisheries, consisting principally of eels and grey mullet, which form an important branch of commerce throughout Italy. Each basin is under the superintendence of a chief or factor, who has several men under his orders, the whole forming a staff of about four hundred men, who are embodied and under discipline as on board ship. These men pass their time in fishing, and salting the fish that they are unable to sell fresh. By means of a most ingenious system the rivers which encircle the lagune, at a certain season of the year (the 2nd February) are allowed to flow in till the end of April, when the sluices are closed, thus introducing the young fry which ascend these rivers from the sea, and take shelter in the basins; this period is called *la montata*. The fish are allowed to increase in size. The fish do not attempt to escape until they are full grown, when the same instinct which has caused them to take shelter in the basins impels them to attempt to go back to the sea; this is called *la discesa*. The fishermen, taking advantage of their habits, place their nets so as to take the fish in quantities. These attempts at migration take place during the months of October, November, and December, and especially during the darkest nights. The fish taken in this manner are sent to the town of Comacchio, where they are sold to traders, who fill the wells of their boats with them, and take them up the Pô and Ticino. Those which are not sold are cured on the spot, and exported to every part of Italy. In 1865, the quantity of fish taken in the lagune of Comacchio was 9,595 last, weighing 371,570 kilos (370 tons), of the value of 323,988 frs. (£12,960); to this must be added the quantity of fresh fish sold, amounting to the weight of 123,082 kilos (121 tons), of the value of 57,536 frs. (£2,301). The contrivances for enticing the young fish, and for retaining the old from returning to the sea, are very ingenious, and have been described by Tasso and Ariosto—

"Come il pesce colà, dove impaluda
Ne' seni di Comacchio il nostro mare,
Fugge dall' onde impetuosa e cruda;
Cercando in placide acque, ove ripare.
E vien, che da sè stesso ei si rinchiuda
In palustre prigion, nè può tornare;
Chè quel serraglio è con mirabil uso
Sempre all' entrar aperto, all' uscir chiuso."
Gerus: Lib: vii. 46.

Ariosto calls Comacchio

"La città, che in mezza alle pesce
Paludi del Pô teme ambe le foel."
Orl: Fur: iii. 41.

COMMERCE BETWEEN FRANCE AND SWITZERLAND.—The commerce between France and Switzerland has considerably increased during the first nine months of the past year as compared with a similar period of 1866. This is in a great measure due to the Treaty of Commerce between the two countries. In 1866 the total value of the exports from Switzerland to France amounted to 29,409,000 fr. (£1,176,360), and in 1867 to 52,267,000 fr. (£2,090,680), showing an increase of 22,858,000 frs. during nine months. Of this, 10,000,000 of francs represent the increase in the exportation of cattle; the export of cheese has increased from 3,025,000 frs. to 5,700,000 frs.; silk, from 9,227,000 frs. to 18,557,000 frs. There has been a falling off of 1,360,000 frs. in exports of timber. The exports of jewellery in 1867 amounted to 1,368,000 frs. The imports from France to Switzerland amounted, during the first nine months of the past year, to 149,148,000 frs.,

showing an increase of 27,000,000 of francs on those of 1866. The principal items of this amount relate to silk, the value of the imports of which have increased from 20,008,000 frs. to 32,902,000 frs.; cotton and wool, from 15,267,000 frs. to 23,881,000 frs.; silk stuffs, from 21,841,000 frs. to 37,554,000 frs.; tallow and fatty substances, from 572,000 frs. to 1,250,000 frs.; refined sugar, from 3,958,000 frs. to 4,835,000 frs. The falling off has principally been in the cereals, the importations of which have decreased from 8,086,000 frs. to 1,681,000 frs., in consequence of the insufficiency of the harvest in France. The imports of wines and spirits have also fallen off from 15,800,000 frs. to 10,189,000 frs. A great part of the raw silk, cotton, and wool imported by Switzerland is not of French origin, but comes merely through France to supply the Swiss manufacturer. From this it appears that although the exports from Switzerland to France have increased about 60 per cent., the imports from France to Switzerland have not increased more than from 5 to 6 per cent. in the same period. Thus the international trade of Switzerland with France has a tendency to import less and export more.

Colonies.

GENERAL COLONIAL STATISTICS.—The official returns of the colonial office give the following statistics of the several British colonies and dependencies:—

	Area. Square miles.	Population.
India, British.....	956,436	144,948,356
„ Native States..	596,790	47,909,100
North American Colonies	632,631	3,701,461
Australasia.....	2,582,072	1,599,580
British West Indies ..	88,683	1,097,627
Cape of Good Hope and Natal	119,328	425,767
Ceylon.....	24,700	2,049,728

Other colonies with the above bring up the total area to 4,427,232 square miles, and the population to 154,810,787. The public revenue of these vast possessions in the year 1865 was nearly £63,000,000. The public debt is not quite £140,000,000. The tonnage entered and cleared in 1865, exclusive of the coasting trade, was about £26,000,000. The imports into these colonies in 1865 amounted to £128,375,053, and the exports to £141,368,102. The wool exported from these colonies amounted to £12,234,580; raw sugar, value £7,158,163; coffee, £3,308,963; wood, £3,877,530; fish, £1,668,260; and the cotton from India alone was valued at £37,573,637.

LEAD IN QUEENSLAND.—It is stated on good authority that a lead mine has been discovered in the Burnett district, the ore of which yields a sufficient proportion of silver to make its working a profitable pursuit. The distance of the mine from port is about 100 miles. The discoverer has, in combination with others, some of whom have capital, applied for 160 acres.

Forthcoming Publications.

MODERN SCREW PROPULSION. By N. P. Burgh, Engineer. (*E. and F. N. Spon.*)—This work will be published in fifteen monthly parts, demy 4to., price 2s. each part. (Part I. to be ready on the 1st of February.) The leading engineering firms of England and Scotland have combined in sending to the author valuable information, with examples of screw propellers of their latest practice hitherto published. The plates are copied from the working drawings lent for that purpose. The proportions are fully dimensioned and the details are fully depicted as completely as required for practical construction.

Notes.

TELEGRAPHY IN ITALY.—During the third quarter of last year, viz., from 1st of June to 30th September, the amount received for telegrams throughout the kingdom of Italy was 1,028,509 francs 10 cents. (£41,140), of this 155,554 francs 40 cents. was paid by foreign telegraph companies for messages sent to Italy; 165,283 francs 16 cents. for foreign dispatches in transit; 545,742 francs 72 cents. for dispatches for the interior; 133,004 francs 32 cents. for foreign dispatches, and 28,924 francs 50 cents. for various dispatches. The offices which sent the greatest number of dispatches were those of Florence, for which was received 104,851 francs 36 cents., and Turin, which received 102,076 francs 92 cents.; and the office which received the least was that of Cagliari (Island of Sardinia), only 15,960 francs. The Government dispatches, sent free, would, according to the tariff, represent 158,026 francs 35 cents., of which the largest share, naturally sent from Florence, would represent 157,045 francs. The total amount received during the first nine months of last year, that is to say, from the 1st of January to the 30th September, was 3,023,009 francs 79 cents. (£120,920), a decrease on the receipts, during the corresponding period of the previous year, of 1,689 francs 18 cents. (£67 10s.).

ITALIAN RAILWAYS.—The total length of railways in Italy amounted, on the 1st July, 1867, to 4,950 kilometres, including the 21 kilos. of horse tramway, from Settimo, near Turin, to Rivarolo; and, with the 258 kilometres belonging to the Roman States, the total length of the railways in the whole Italian peninsula is 5,310 kilometres. The total receipts of the various railway companies throughout the kingdom during the first six months of the past year amounted to 36,362,441 fr. 17 c. The following are the receipts of the principal lines:—

	Francs.
Upper Italian railways	24,235,847.59
Roman Railway Company	7,302,660.29
Southern Railways	4,018,707.69
Victor Emanuel, or Calabro-Sicule Railway	556,736.73

The greatest annual receipts, in proportion to length opened, were those of the Central Italian Railway (Piacenza to Pistoja), namely 28,205.76 frs. per kilometre, and next the Piedmontese lines, 21,322.85 per kilometre. The line of which the receipts were the least, in proportion to length, was that from Reggio (Calabria) to Lazzaro (Victor Emanuel Railway). Compared with last year, the receipts per kilometre are less, with the exception of the line from Ancona to Orte; this is due to the opening of the line to Orte connecting it with the railway in the Roman States. The greater receipts during the previous year are no doubt owing to the great traffic during the late war, and to the cholera and financial crisis during the past year.

POSTAL STATISTICS OF ITALY.—The Government have the exclusive right of the conveyance of letters in Italy. The rate of inland postage, formerly of 15 cents., has been raised to 20 cents. on letters weighing less than 10 grammes (0.35 oz.), and great facilities are also afforded newspapers and other periodicals, which are transmitted throughout the kingdom for 1 cent. under 40 grammes (1.41 ozs.). The number of post-offices in Italy, up to 1st Jan., 1865, was 2,416, including 11 railway post-offices, and four offices on board steamers, of which two are on lakes and two on the sea. In 1865, 67,481,155 letters were posted, of which 60,557,610 were stamped, and 6,136,894 unstamped, 757,949 registered, and 30,702 insured, for the amount of 35,170,391 frs. (£1,406,815 12s.). The number of letters free of tax amounted to 28,669,472; printed periodicals, to 53,066,188; other printed matter to 6,321,337. The number of money-orders (*vaglia*) issued for inland payment was 2,900,958, amounting to 155,584,799 frs. 39 c.;

the number of money-orders sent abroad was 32,732, amounting to 2,106,431 frs. 89c., whilst the number of foreign money-orders paid in Italy was 36,023, amounting to 1,953,537 frs. 49 cents. The number of postage-stamps sold in 1865 was 81,903,543, for the amount of 11,251,512 frs. 85 c. (£450,060 10s. 8½d.). The total receipts of the Post-office amounted to 14,527,562 frs. 60c. (£581,102 10s. 4d.). In 1864 were sent into the Venetian provinces 8,853,373 private letters; 2,139,826 official letters; 213,512 book packets; 1,823,315 newspapers, 54 express private dispatches, and 168 government dispatches were sent. The amount of money sent by the Government was 11,363,925 frs.; and 166,378,210 frs. for private individuals. 763 passengers were carried by the mail conveyances.

STREET NAMES IN PARIS.—The following are amongst the names given to streets recently opened, or now in course of being formed:—Aubigné, Bellay, Santeuil, Abbé La Salle, de Vigny, Andrieux, Treillhard, Meyerbeer, Glück, Rochambeau, Magnan, Dieu, Véronèse, Primatice, Philippe de Champaigne, Nansouty, Broussais, Excelmans, Isabey, Mozart, Mignard, Hamelin, Ornano, Custine, Championnet, Montcalm. It will be perceived that they are principally those of artists, writers, and musicians.

Correspondence.

THE MANUFACTURE OF FLOUR BY M. MÈGE MOURIÈS.

SIR,—This gentleman has suggested a beautiful theory of the structure of a grain of wheat, and developed that theory practically, on a large scale, with great ingenuity. M. Mège Mouriès does not seem, however, to be fully aware of the perfection with which corn is ground in the ordinary way, so as to produce the whole of the white flour contained in the grain without any contamination by browning matters. That gentleman is also in error when he states that, with the exception of the pure white, all the remainder of the grain is devoted to animal food, for every English miller can show that the cflal used for that purpose contains no flour, either white or brown. We in England are not quite so much prejudiced in favour of white bread as they are in France, and brown bread is much in demand, notwithstanding a prevailing idea that brown bread may, perhaps, owe its colour to the admixture of improper materials. It is, moreover, a recommendation from the highest medical authorities not to make use of white bread continually, but to take brown bread occasionally, or, in other words, that the use of white bread entirely is not conducive to the best health. In fact there are many peoples, even in Europe, who live and thrive upon black bread alone. It is also a mistaken idea that bran is of the nature of straw, and therefore contains no nutriment, for it is well known in all countries that bran alone will keep animals in good condition, which straw will not. English millers produce fine white flour by a most careful dressing of the faces of the stones, both the upper and the lower having the same cutting qualities. But other millers arrive at the same end more easily by using a bedstone of hard porcelaneous limestone, possessing no cutting qualities whatever. For the runner they choose a hard, sharp kind of granite, or other very hard stone that may possess the requisite cutting qualities well developed. By such means the coats of bran are spread out, as it were, and all the flour cleaned off. This operation is further promoted in powerful mills by the use of heavy runners, of great specific gravity, four feet two inches in diameter, and from sixteen to eighteen inches deep, or about a ton and a-half of solid stone. I have seen twelve bushels ground within the hour by one pair of stones, producing the finest flour, not over heated, and beautiful clean bran, not at all torn; but the power applied would drive an English millhouse into palsy. This work cannot be performed in English mills, partly from want of sufficient power, but more on account of the

runners being mostly made up of plaster of paris and brickbats, having altogether much less specific gravity than solid stone. The flour or meal is kept sufficiently cool at high speeds by dressing the runners very hollow, especially towards the eye, so that only about six or eight inches, measured radially from the circumference, does the real work of grinding, and plenty of cool air is necessarily drawn in. The additional precaution is also adopted of having no box-hoop covering over the runner, and using instead a light, open, upright hoop to confine the flour. The Bovill patent, the subject of innumerable lawsuits, intended, by means of blowing and exhausting apparatus, to remove the stive, is a useless piece of absurdity, calculated to increase the evil, and besides consuming a large amount of power, may, perhaps, afford the means of adulterating the flour with matters that ought not to be in it. Indeed, it may be said generally that in English mills a small portion only of the driving power is applied to the actual grinding, the remainder being consumed in driving many accessories, and friction. It is no argument in favour of this new process that it has been carried out on a large scale, because a new idea is always seized upon with energy in France, which is by no means the case with us—witness the decorticating process, now acknowledged to be a total failure. It may be within the recollection of some of your readers that a few years ago two French professors of the art of making bread came to England, in order to teach our bakers to make thirty or forty more loaves, of due weight, out of one sack of flour, than was usual in the trade. But the mystery was most successfully exploded by the practical lectures on this subject given by Professor Pepper in the Royal Polytechnic Institution.—I am, &c., HENRY W. REVELEY.
1, Baker-street, Reading.

MEETINGS FOR THE ENSUING WEEK.

- MON.....Society of Arts, 8. Cantor Lectures. Dr. Letheby, "On Food."
R. United Service Inst., 8½. Major Fosbery, "On Explosive Bullets, and their application to Military Purposes."
British Architects, 8.
Medical, 8.
Asiatic, 3.
Victoria Inst., 8.
TUES ...Civil Engineers, 8. Renewed discussion upon "The Victoria Bridge," by Mr. Wm. Wilson; and "New Railways at Battersea, with the Widening of the Victoria Bridge," by Mr. Chas. Douglas Fox.
Statistical, 8. Mr. R. Dudley Baxter, "On National Income."
Pathological, 8.
Ethnological, 8.
WED ...Society of Arts, 8. Mr. W. Hawes, Chairman of Council, "On the Reports of the Artizans selected to Visit the Paris Universal Exhibition of 1867."
Geological, 8.
R. Society of Literature, 8½.
Archæological Assoc., 8½.
THUR ...Royal, 8½.
Antiquaries, 8½.
Zoological, 8½.
R. Society Club, 6.
Mathematical, 8.
FRI.....Royal Inst., 8. Professor Tyndall, "On Faraday as a Discoverer."
Quekett Microscopical Club, 8.
SATRoyal Inst., 3. Professor Roscoe, "On the Non-Metalllic Elements."

Patents.

From Commissioners of Patents' Journal, January 10.

GRANTS OF PROVISIONAL PROTECTION.

- Alcohol meter, for ascertaining the alcoholic strength of liquids—3662—W. E. Newton.
Blankets used in machines for printing textile fabrics, &c.—3674—E. J. Hughes.
Blocks and bearings, plummer—3654—W. Burley and W. H. Glasson.
Braiding machines—3672—E. G. and E. E. Rafer.
Capsules—3543—G. Whitehead.
Cards, condenser—3598—W. Preston and C. Walker.
Carriages, &c.—3692—R. Howarth.
Cartridges—3633—J. Davidson.
Chains, &c., manufacturing—2492—A. E. Gelhaye.
Chains, &c., preventing jerks to—3637—J. Davison.

- Chains, &c., preventing undue strains upon—3641—W. Dixon and W. Brown.
Chimney-tops—3623—E. Field.
Chimney-tops—3686—J. Capper.
Clocks, &c., application of electricity to—3684—C. E. Brooman.
Coffee roaster—3653—S. Myers.
Colouring matters—3657—A. M. Clarke.
Compasses and dividers, proportional—3607—W. A. Hubbard.
Cylinders, steam—3530—N. Paxman, jun.
Emery paper, substitute for—3615—R. Chauncy.
Explosive compounds—3652—F. A. Abel.
Fabrics, warp—3665—S. and F. Lennard.
Fibrous materials, carding and spinning—3621—H. A. Bonneville.
Fire alarm and extinguisher—3647—C. J. Adams.
Fish, salt-water, conveying through fresh water, &c.—3548—L. A. Damm.
Floors, fire-proof—3605—E. T. Bellhouse.
Fuel, artificial—9664—G. E. Allshorn.
Furnaces—3663—J. Addie and F. Kohn.
Furnaces—3702—J. Davison.
Gas burners—3696—C. Churchill.
Gas, &c.—3318—P. Salmon.
Glass bottle house pot carriages, &c.—3613—E. Breffit.
Gloves—3670—B. and J. B. Bowen.
Gutta-percha, &c., treating—3542—E. R. Sintzenich.
Hemp, &c., softening—3643—W. W. Urquhart and J. Lindsay.
Horn and whalebone, joining—3619—C. Beck.
Iron, steel, &c.—3667—G. J. and T. C. Hinde.
Life from drowning, saving—3556—A. McMurdo.
Liquid substances, heating—3678—D. Steele.
Metallurgical operations, &c., producing heat for—3698—R. Fothergill.
Milling tools, &c., manufacturing—3655—P. F. Tranchat.
Motors—3690—W. E. Newton.
Nails, cutting and heading—3651—M. J. Rice.
Needle wrappers—3680—J. Clarke.
Optical illusion—3617—J. Simmons.
Pomade—3639—J. G. Tongue.
Pumps, steam—3630—W. Walker and E. Holt.
Railway breaks—3676—J. Cockshoot, jun., and H. Weatherill.
Railway breaks, &c.—3597—T. Comfield, jun.
Railway carriages and trains—3629—C. De Bergue and W. Dredge.
Railways—3661—T. Harrison.
Saddles—3611—J. Clay.
Shot and shells—3688—A. V. Newton.
Size, boiling—3627—J. Kenyon.
Smoke, consuming—3700—W. Kendrick and J. Wooldridge.
Soap—3659—G. Layton.
Tanning apparatus—3649—J. Dawkins.
Telegraphs—3608—J. S. Gisborne.
Telegraphs—3609—L. M. Becker.
Traps for pigeon shooting, &c.—3660—F. Render.
Valves—3421—W. Black and T. Hawthorn.
Whips, &c., holders for—3666—W. Hewitt.
Windows, &c.—3694—E. Evans.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

- Furnaces, &c., feeding fuel into—27—M. J. Frisbie.
Telegraphs—3—W. R. Lake.

From Commissioners of Patents' Journal, January 14.

PATENTS SEALED.

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|--|---------------------------------------|
| 2040. E. Hohenbruck. | 2086. J. Mannock. |
| 2045. F. Wilkins. | 2087. W. McAndrew. |
| 2047. W. B. Haigh. | 2088. T. Pirie. |
| 2065. H. Fletcher. | 2094. G. Weedon. |
| 2067. E. T. Hughes. | 2096. A. De Smet. |
| 2076. J. M. Hetherington and R. W. Pitfield. | 2098. G. H. Daw. |
| 2108. J. Palmer, J. Palmer, jun., and T. Palmer. | 2106. A. Morton. |
| 2112. R. T. Bradbury and T. Bottomley. | 2117. G. T. Bousfield. |
| 2180. P. A. Rohart. | 2129. W. Potts. |
| 2186. E. Ravenscroft. | 2153. C. H. Murray. |
| 3066. J. T. Caird & S. Robertson. | 2166. C. E. Brooman. |
| 2078. A. B. Ibbotson. | 2168. G. L. Bares and J. F. Ladougue. |
| 2079. T. Redwood. | 2234. J. Edwards. |
| 2082. F. B. Vallance. | 2282. E. T. Horsley. |
| 2085. G. W. Hayes. | 2294. H. A. Avery and G. Penabert. |
| | 2408. A. M. Clark. |

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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| 50. T. Richardson and M. D. Rücker. | 96. J. G. Jones. |
| 82. J. F. Spencer. | 95. R. Chidley. |
| 55. G. B. Galloway. | 101. F. Barnes, D. Hancock, and E. Cowpe. |
| 60. J. J. Blackham. | 127. J. Young. |
| 77. H. Chamberlain. | 129. F. C. Fourgeau. |
| 89. J. Ramsbottom. | 130. J. B. Farrar and J. Hirst. |
| 164. R. Mallet. | 228. J. Hamilton, jun. |
| 166. W. C. Hicks. | 725. H. Owen. |
| 119. G. Davies. | |

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

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| 194. T. Gibson and W. and H. Knighton. | 251. G. T. Bousfield. |
| 62. S. Moulton. | 88. W. Bullough. |
| 89. G. Whight. | 87. M. A. Muir & J. McIlwham. |